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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/692,007	10/19/2000	Stephen P. DeOrnellas	TEGL1082US1 SRM	7175

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EXAMINER	
UMEZ ERONINI, LYNETTE T	
ART UNIT	**PAPER NUMBER**
1765	

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/692,007	DEORNELLAS ET AL.	
	Examiner	Art Unit	
	Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-13,15-17,19-40,42,44,46-49 and 51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-13,15-17,19-40,42,44,46-49 and 51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicants' Remarks in amendment, filed April 16, 2004, include persuasive arguments to show the Fullowan reference fails to teach or disclose slowing the rate of erosion of the hard mask by providing energy to the reactor in order to increase a rate of oxidation of the hard mask. Hence, the previous rejection is withdrawn.

Claim Objections

1. Claims 26, 30, 34, 35, and 38 are objected to because of the following informalities:

In claim 26, line 4;

In claim 30, line 5;

In claim 34, line 5;

In claim 35, line 4;

In claim 38, line 4; "bolide" is misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> ((e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 10-13, 15-17, 19-40, 42, 44, 46-49, and 51 rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (US 6,004,882).

As pertaining to claims 10-13, 15-17, 19-40, 42, 44, 46-49, and 51, Kim teaches a method of etching a platinum layer of a semiconductor device. The method comprises using an etching process to form a mask pattern and a adhesive mask-layer pattern on the Pt layer, heating the semiconductor substrate (same applicant's workpiece) and etching the Pt layer using mask pattern and the adhesive layer mask pattern (Abstract).

The method also comprises: a Ti adhesive mask-layer **110** (same as applicants' hard mask) is patterned using a mixture of argon and chlorine. Following the formation of the mask pattern **110** and etching mask pattern **112**, the semiconductor substrate is heated to a temperature of approximately 120~300°C (temperature range encompasses applicants' temperature range of from 80 to 300°C) without exciting a plasma of the MERIE equipment. The Pt layer **108** is then etched using an etching gas containing O_2. Furthermore, the O_2 gas changes the Ti layer of the adhesive layer mask pattern **110** into TiO_x, which acts as an additional etching mask pattern during the etching of the Pt layer. That is, a portion of O_2 ions and radicals partially oxidize the Ti layer into a TiO_x layer, thereby reducing an erosion velocity of the mask (column 3, line 49 - column 4, line 61). Hence, the above reads on,

A method for etching a pattern on a workpiece including the steps of:

selecting a workpiece with a hard mask deposited over a layer to be etched, which hard mask is comprised of a reactive metal;

processing the workpiece in a reactor using an etch step and exposing the hard mask to the etch; and

slowing the rate of erosion of the hard mask by providing energy to the reactor in order to increase a rate of oxidation of the hard mask.

It is noted that Kim further teaches, "The TiO_x adhesive layer mask pattern **110**A is eroded at a high temperature of approximately 120~300°C at a rate equivalent to that at which it is eroded at room temperature. Accordingly, because the high temperature hastens the oxidation of Ti, and thus the formation of a TiO_x layer, and because the erosion rate of the TiO_x layer is relatively slow, erosion by oxygen ions or sputtering of a radical is relatively reduced according to this invention. Damage of the adhesive layer mask pattern **110**A is therefore prevented at high process temperatures" (column 5, lines 15-24), which further supports applicants' limitation of slowing the rate of erosion of the hard mask by providing energy to the reactor in order to increase a rate of oxidation of the hard mask.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

Itue

June 15, 2004